

CLAIM SUMMARY DOCUMENT

1. (Currently Amended): A method of fabricating a semiconductor device comprising the steps of:
 - a) forming a non selective ~~N-type buried~~N+ type buried layer comprising a first majority dopant having a first coefficient of diffusion; and
 - b) forming a selective ~~P-type buried~~P+ type buried layer comprising a second majority dopant having a coefficient of diffusion greater than said first coefficient of diffusion.
2. (Currently Amended): The method set forth in claim 1 wherein the step of forming said non selective ~~N-type buried~~N+ type buried layer is performed before the step of forming said selective ~~P-type buried~~P+ type buried layer.
3. (Currently Amended): The method set forth in claim 1 wherein the step of forming said selective ~~P-type buried~~P+ type buried layer is performed before the step of forming said non selective ~~N-type buried~~N+ type buried layer.
4. (Currently Amended): The method set forth in claim 1 wherein the step of forming said selective ~~P-type buried~~P+ type buried layer includes the step of controlling the amount of said second majority dopant relative to the amount of said first majority dopant such that said selective ~~P-type buried~~P+ type buried layer over compensates said non selective ~~N-type buried~~N+ type buried layer completely throughout said non selective ~~N-type buried~~N+ type buried layer in a region where said selective ~~P-type buried~~P+ type buried layer is formed.
5. (Currently Amended): The method set forth in claim 1 wherein the step of forming said selective ~~P-type buried~~P+ type buried layer includes the step of controlling the amount of said second majority dopant relative to the amount of said first majority dopant such that said selective ~~P-type buried~~P+ type buried layer does not completely over compensate said ~~N-type buried~~N+ type buried layer throughout said non selective ~~N-type buried~~N+ type buried layer in a region where said selective ~~P-type buried~~P+ type buried layer is formed.
6. (Currently Amended): The method set forth in claim 1 wherein the step of forming said non selective ~~N-type buried~~N+ type buried layer includes the step of selecting said first majority dopant from one of arsenic or antimony and the step of forming said

selective ~~P-type buried~~P+ type buried layer includes the step of selecting boron for said second majority dopant.

7. (Currently Amended): The method set forth in claim 1 wherein the step of forming said selective ~~P-type buried~~P+ type buried layer includes the step of controlling the amount of said second majority dopant relative to the amount of said first majority dopant such that said selective ~~P-type buried~~P+ type buried layer has a maximum dopant concentration greater than the maximum dopant concentration of said non selective ~~N-type buried~~N+ type buried layer.

8. (Currently Amended): The method set forth in claim 1 further including the steps of:

- a) forming an N type layer on said non selective ~~N-type buried~~N+ type buried layer; and
- b) forming a P well extending from said selective ~~P-type buried~~P+ type buried layer through said N type layer.

9. (Currently Amended): The method set forth in claim 8 in which the dopants from the N type and ~~P-type buried~~P+ type buried layers diffuse into the N type layer.

10. (Currently Amended): The method set forth in claim 9 in which the dopants of the ~~P-type buried~~P+ type buried layer extend further into the N type layer than do the dopants of the ~~N-type buried~~N+ type buried layer.

11. (Currently Amended): The method set forth in claim 8 wherein the step of forming said P well includes the step of controlling the amount of a majority dopant used in forming said P well relative to the amount of said first majority dopant such that the maximum majority dopant concentration of said non selective ~~N-type buried~~N+ type buried layer is greater than the maximum majority dopant concentration of said P well.

12. (Currently Amended): The method set forth in claim 1 wherein the step of forming said selective ~~P-type buried~~P+ type buried layer includes the steps of implanting and diffusing said second majority dopant.

13. (Currently Amended): The method set forth in claim 12 further including the additional step of forming an epitaxial layer on said selective ~~P-type buried~~P+ type buried layer after the step of implanting said second majority dopant.

14. (Original): The method set forth in claim 13 wherein the step of forming said epitaxial layer is performed before the step of diffusing said second majority dopant.

15. (Original): The method set forth in claim 14 wherein the step of diffusing said first majority dopant includes the step of controlling said diffusion such that said second majority dopant up diffuses into said epitaxial layer.

16. (Currently Amended): The method set forth in claim 12 further including the steps of:

- a) forming an N type layer on said non selective ~~N type buried~~ N+ type buried layer; and
- b) forming a P well extending from said selective ~~P type buried~~ P+ type buried layer through said N type layer.

17. (Original): The method set forth in claim 16 wherein the step of forming said N type layer is performed before the step of diffusing said second majority dopant.

18. (Currently Amended): The method set forth in claim 17 wherein the step of forming said P well includes the step of controlling the amount of a majority dopant used in forming said P well relative to the amount of said first majority dopant such that the maximum majority dopant concentration of said non selective ~~N type buried~~ N+ type buried layer is greater than the maximum majority dopant concentration of said P well.

19. (Currently Amended): The method set forth in claim 1 wherein

- a) the step of forming said non selective ~~N type buried~~ N+ type buried layer includes the steps of implanting and diffusing said first majority dopant; and
- b) the step of forming said selective ~~P type buried~~ P+ type buried layer includes the steps of implanting and diffusing said second majority dopant.

20. (Original): The method set forth in claim 19 wherein the steps of implanting and diffusing said first majority dopant are performed before the steps of implanting and diffusing said second majority dopant.

21. (Currently Amended): The method set forth in claim 19 further including the additional step of forming an epitaxial layer on said selective ~~P type buried~~ P+ type buried layer after the step of implanting said second majority dopant.

22. (Original): The method set forth in claim 21 wherein the step of forming said epitaxial layer is performed before the step of diffusing said second majority dopant.

23. (Original): The method set forth in claim 22 wherein the step of diffusing said first majority dopant includes the step of controlling said diffusion such that said first majority dopant up diffuses into said epitaxial layer.

24. (Original): The method set forth in claim 21 wherein the step of forming said epitaxial layer is performed before the step of diffusing said first majority dopant.

25. (Original): The method set forth in claim 24 wherein the step of diffusing said first majority dopant includes the step of controlling said diffusion such that said first majority dopant up diffuses into said epitaxial layer.

26. (Currently Amended): A method of fabricating a semiconductor device in a wafer comprising the steps of:

- a) implanting across all of said wafer an N type dopant having a first coefficient of diffusion and at a first dose level;
- b) diffusing said N type dopant into said wafer to form an ~~N-type~~ buried N+ type buried layer;
- c) masking a portion of said wafer;
- d) implanting into said wafer in areas not masked a P type dopant having a coefficient of diffusion greater than said first coefficient of diffusion; and
- e) diffusing said ~~p-type~~ P type dopants into said wafer to form a ~~P-type~~ buried P+ type buried layer.

27. (Original): The method set forth in claim 26 wherein the step of implanting said N type dopant is performed before the step of implanting said P type dopant.

28. (Original): The method set forth in claim 26 wherein the step of implanting said P type dopant is performed before the step of implanting said N type dopant.

29. (Currently Amended): The method set forth in claim 26 wherein the step of implanting said P type dopant includes the step of controlling the amount of said P type dopant relative to the amount of said N type dopant such that said ~~P-type buried~~ P+ type buried layer has a maximum dopant concentration greater than the maximum dopant concentration of said ~~N-type buried~~ N+ type buried layer.

30. (Currently Amended): The method set forth in claim 26 further including the steps of:

- a) forming an N type layer on said ~~N-type buried~~ N+ type buried layer;
and
- b) forming a P well extending from said ~~P-type buried~~ P+ type buried layer through said N type layer.

31. (Original): The method set forth in claim 30 wherein the step of forming said N type layer is performed before the step of diffusing said P type dopant.

32. (Currently Amended): The method set forth in claim 31 wherein the step of forming said P well includes the step of controlling the amount of a majority dopant used in forming said P well relative to the amount of said N type dopant such that the maximum majority dopant concentration of said ~~N-type buried~~N+ type buried layer is greater than the maximum majority dopant concentration of said P well.

33. (Original): The method set forth in claim 26 wherein the steps of implanting and diffusing said N type dopant are performed before the steps of implanting and diffusing said P type dopant.

34. (Currently Amended): The method set forth in claim 26 further including the additional step of forming an epitaxial layer on said ~~P-type buried~~P+ type buried layer after the step of implanting said P type dopant.

35. (Original): The method set forth in claim 34 wherein the step of forming said epitaxial layer is performed before the step of diffusing said P type dopant.

36. (Original): The method set forth in claim 35 wherein the step of diffusing said N type dopant includes the step of controlling said diffusion such that said N type dopant up diffuses into said epitaxial layer.

37. (Original): The method set forth in claim 34 wherein the step of forming said epitaxial layer is performed before the step of diffusing said N type dopant.

38. (Original): The method set forth in claim 37 wherein the step of diffusing said N type dopant includes the step of controlling said diffusion such that said N type dopant up diffuses into said epitaxial layer.

39. (Original): The method set forth in claim 26 wherein the step of implanting said N type dopant includes the step of selecting said N type dopant from one of arsenic or antimony and the step of implanting said P type dopant includes the step of selecting boron for said P type dopant.

40-56. (Canceled)

57. (Currently Amended): A method of fabricating a semiconductor device comprising the steps of:

forming non selectively an ~~N-type buried~~N+ type buried layer extending over a first layer;

forming selectively at least one ~~P-type buried~~ P+ type buried layer in a selected portion of the ~~N-type buried~~ N+ type buried layer;

forming a semiconductor layer extending over the N and ~~P-type buried~~ P+ type buried layers, the semiconductor layer having a doping concentration lower than the ~~N-type buried~~ N+ type buried layer; and

diffusing the ~~N-type buried~~ N+ type buried layer and the ~~P-type buried~~ P+ type buried layer into the semiconductor layer such that the ~~P-type buried~~ P+ type buried layer extends further into the semiconductor layer than the ~~N-type buried~~ N+ type buried layer extends into the semiconductor layer.

58. (Previously Presented): The method set forth in claim 57, wherein the semiconductor layer is N type.

59. (Currently Amended): The method set forth in claim 58, including forming a P well extending from the ~~P-type buried~~ P+ type buried layer through the semiconductor layer.

60. (Previously Presented): The method set forth in claim 59, wherein forming the P well includes selectively introducing a P type dopant and diffusing after the diffusion step for the buried layers.

61. (Currently Amended): The method set forth in claim 57, wherein forming the ~~P-type buried~~ P+ type buried layer includes selectively introducing a P type dopant and diffusing into the first buried layer before forming the semiconductor layer.

62. (Previously Presented): The method set forth in claim 57, wherein the first layer is an insulator.

63. (Previously Presented): The method set forth in claim 57, wherein the first layer is a semiconductor substrate.

64. (Currently Amended): The method set forth in claim 57, wherein the ~~N-type buried~~ N+ type buried layer is formed by non selectively introducing an N type dopant into the first layer and diffusing.

65. (Currently Amended): The method set forth in claim 57, wherein the ~~N-type buried~~ N+ type buried layer is formed by growing an epitaxial layer doped with an N type dopant on the first layer.